U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 2
Emergency and Remedial Response Division
290 Broadway, 19th Floor
New York, New York 10007-1866

By Email

May 20, 2015

Ms. Suzy Walls
ARCADIS U.S., Inc.
114 Lovell Road, Suite 202
Knoxville, TN, 37934

RE: Comments on the Technical Memorandum on Candidate Technologies, Dated March 2012, Revised March 2015, Rolling Knolls Landfill Superfund Site, Chatham, New Jersey

Dear Ms. Walls:

The U.S. Environmental Protection Agency (EPA) has completed its review and is providing comments on the Technical Memorandum on Candidate Technologies (TMCT), dated March 2012, Revised March 2015 prepared by ARCADIS U.S., Inc. for the Rolling Knolls Landfill Superfund Site, located in Chatham, New Jersey. This document has also been reviewed by the New Jersey Department of Environmental Protection (NJDEP). All comments have been collated as appropriate and attached.

As described in *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA/540/G-89/004, EPA, 1988), the feasibility study (FS) consists of three phases: a screening of remedial technologies, development of remedial action alternatives, and a detailed analysis of the alternatives. Although the TMCT should present the results of the screening of remedial technologies for the site, the TMCT appears to be limited to elevated volatile organic compounds and inorganics found in soil and groundwater. As such, the remedial technologies screened did not consider the presence of semi-volatile organic compounds, PAHs, PCBs, or pesticides. The TMCT shall incorporate screening of remedial technologies that represent multiple technologies to address the range of constituent classes that exceed New Jersey (NJ) Residential and Non-Residential Soil Remediation Standards (SRS) at the site.

EPA disapproves the TMCT as submitted, and requires ARCADIS to amend the document in accordance with the attached comments. The TMCT amendment shall be incorporated into the Technical Memorandum on Development and Screening of Remedial Alternatives (DSRA) and shall be fully inclusive of all site data including the

results from the additional Data Gaps Sampling. All analytical results including the results from Data Gaps Sampling and the enclosed comments must be addressed in the DSRA. If all comments are not adequately addressed, EPA may exercise its right to modify the document and provide the revised document to you for implementation or to direct you to make specified modifications to the document.

Please be advised that your submission of a deficient DSRA that is not inclusive of all comments received from EPA regarding the TMCT may constitute a violation of the Administrative Settlement Agreement and Order on Consent (index No. II-CERCLA-02-2005-2034) (the Agreement) and that stipulated penalties may begin accruing on the day after a satisfactory version was due to be received by EPA. Consistent with the provisions of the Agreement, stipulated penalties will continue to accrue until the date that EPA receives a satisfactory version of the DSRA from you.

Please review all comments and contact me within three (3) days of receipt of this letter if you wish to discuss the attached comments. If you have any other questions regarding this matter, or would like to discuss current or future work at the site, please give me a call at (212) 637-4362.

Sincerely yours,

Tanya Mitchell

Tanya Mitchell
Special Projects Branch
Remedial Project Manager

cc: J. McKenzie, NJDEP

EPA's Comments on the Technical Memorandum on Candidate Technologies, Dated March 2012, Revised March 2015,
Rolling Knolls Landfill Superfund Site, Chatham, New Jersey

General Comments

1) The TMCT should include a discussion of current zoning and anticipated future land uses, including risk drivers and exposure pathways for both human health and ecological receptors, followed by the introduction of preliminary remedial action objectives (RAOs) and preliminary remedial goals (PRGs) for the site. RAOs and PRGs are generally formulated prior to the development of general response actions GRA).

2) The TMCT indicates in Section 1.1 that the findings of the human health and ecological risk assessments will be used to refine the list candidate technologies. In Section 1.2, the TMCT states that it "*serves as a conservative screen of candidate technologies*" but further evaluation would be completed "*following approval of the risk assessment documents*." In Section 3.1, the TMCT states that the baseline human health risk assessment (BHHRA) was approved by EPA in 2014. In Section 3.2, the TMCT states that the screening-level ecological risk assessment (SLERA) was approved by EPA in 2013. The 2015 TMCT should be revised to include the findings of the BHHRA and SLERA. In addition, the findings of these documents should be used to formulate the RAOs and PRGs. In turn, the RAOs and PRGs should guide the selection and evaluation of general response actions and remedial technologies for soil and groundwater.

3) The TMCT states that some of the concentrations of polycyclic aromatic hydrocarbons (PAHs), phthalates, polychlorinated biphenyl (PCBs), pesticides and inorganics exceed New Jersey (NJ) Residential and Non-Residential Soil Remediation Standards (SRS). However, the TMCT does not specify which contaminants in particular exceed those standards. The TMCT remedial technology selection is biased to volatile organic compounds (VOCs) and inorganics although other contaminant classes have been detected at the site and presumably exceed the NJ SRS.

4) Some description of the landfill conditions, including landfill caps and bottom liners, if any, will provide the basis of the GRA and technology identification and evaluation. Additionally, the TMCT has not discussed and/or evaluated the closure and post-closure of the landfill, which is a regulatory requirement.

5) There are sections of the document that repeat discussion points. Those sections should be rewritten to focus on the specific media that section is intended to discuss. Alternatively, the report could be reorganized to target remediation of the site as one unit, and then other technologies to treat the downgradient GW plume.

6) The remedial technologies with accompanying process options in tables 2, 3, 4 and 5 should match descriptions of technologies presented in the text. How In-situ Physical Treatment is presented in the text versus the tables is an example.

7) There were several COCs showing exceedences of the sediment and surface water ecological screening criteria, so it is unclear why conclusions are being made that the water quality of the surface water bodies is not being degraded by the landfill. However, technology considerations for surface water

and sediments are not included in this document. Since one of the conclusions made in this report is that surface water and sediments are not impacted, it is recommended that these technologies be reconsidered and updated following completion of the revised risk characterization from the BHHRA and SLERA.

8) Overall, this memorandum needs to be updated with the results from the Data Gaps Sampling and the conclusions should be updated accordingly.

9) Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, requires federal agencies to reduce printing paper use; acquire paper with at least 30% postconsumer recycled content; enable automatic duplexing (double-sided printing); and use other energy-efficient and environmentally preferable features on all eligible agency electronic equipment. In order to better meet the requirements of E.O 13514 and Region 2's green policy, EPA ask for your assistance in helping us meet our goals ***by providing all future documents double-sided***.

Specific Comments

1. Section 1.1 Scope, Paragraph 2: It is stated that "…to address risk identified on the landfill…" Please delete "landfill" and replace with "site."

2. Section 1.2 Objectives, Paragraph 2: As stated previously, the BHHRA was submitted and approved by EPA in June 2014. The SLERA was approved by EPA in April 2013. Indicate what remaining risk assessment documents will be completed or if any revisions are expected.

3. Section 1.2 Objectives, Paragraph 2: Please include a time frame for completion of assessment of site environmental conditions. Major data gaps that need to be addressed from previous investigations should be included in the description of the remaining site assessment activities.

4. Section 2.1.1 Site Description Paragraphs 1 and 2: Paragraph 1, please delete the word "refined" and replace with "estimated." Paragraph 2, last sentence, please insert "estimated" in front of landfill boundary.

5. Section 2.2 Regulatory History: The correct designation for the Regional office is "Region 2."

6. Section 2.3 Investigative History, Bullet 3, Sub-bullet 1, Paragraph 1: Background samples should be presented to substantiate the statement that the occurrence of aluminum, iron, and manganese is widespread and are present in parent rocks from which surficial soils have originated and therefore not suggestive of a point source release near MW-7.

7. Section 2.3 Investigative History, Bullet 3, Sub-bullet 2, Last sentence: This sentence indicates that the area impacted by dichlorodifluoromethane is considered localized, but it should be noted that the area surrounding MW-10 is also a data gap that is being addressed since we do not yet have an understanding for the extent of contamination. Thus, it is premature to characterize the extent of impact by this VOC. Please delete the last sentence and revise.

8. Section 2.3 Investigative History, Bullet 4: In this paragraph it states that the water quality in surface-water bodies adjacent or downgradient of the landfill has not been degraded by water from the

landfill; however surface water and sediments collected in surface water bodies indicates COCs are exceeding ecologically-based screening levels. Thus, it is unclear why this statement is being made and should be updated accordingly.

9. Section 3 Exposure Setting: This section should provide a summary of the major risk drivers and exposure pathways identified in the human health and ecological risk assessments. This information will form the basis for the development of the RAOs and PRGs, and also the identifications and evaluations of the GRAs and technologies.

10. Section 4.1 Feasibility Study Process Overview: In addition to the referenced USEPA guidance, the TMCT should also consider OSWER Directive No. 9355.0-49FS – *Presumptive Remedy for CERCLA Municipal Landfill Sites*. The presumptive remedy is primarily source containment including cover system, source-area groundwater control, and institutional controls to supplement engineering controls.

11. Section 4.1.1 Identification of General Response Actions, Bulleted List: Monitoring should be included as an applicable general response action. Containment actions would require periodic site monitoring and reporting of site conditions and cover integrity. In addition, monitoring reports would be included in Five-Year site reviews.

Ex situ treatment of soil should be included as an applicable general response action.

12. Section 4.1.2 Remedial Technologies and Process Options, Paragraph 2: The text states that "*considering all potentially applicable technologies and process options initially minimizes the likelihood that an applicable technology(ies) gets overlooked early in the FS process*." However, the preliminary screening of remedial technologies for both soil and groundwater media failed to incorporate numerous applicable technologies based on the summary of contaminant distribution in Section 2.3.

An example list of potentially applicable treatment technologies can be found on Table 3-2 Treatment Technologies Screening Matrix from the Federal Remediation Technologies Roundtable (FRTR) Remediation Technologies Screening Matrix and Reference Guide, Version 4.0 (www.frtr.gov/matrix2/top_page.html)

The technologies evaluated appear to be limited to VOCs and inorganics. Remedial technologies screened did not consider the presence of semi-volatile organic compounds (SVOCs), PAHs, PCBs, and pesticides. Future treatment scenarios may need to incorporate a treatment train that may include multiple technologies to address the range of constituent classes. Additional remedial technologies should be considered for these constituents in soil and groundwater media. The description of each process option should state what constituent class(es) would be treated by the remedial technology.

13. Section 4.2 Remedial Technology Descriptions for Soil: Typical remedial technologies associated with in situ and ex situ treatment of contaminated soil were not considered. Section 4.1.2 stated that "*considering all potentially applicable technologies and process options initially minimizes the likelihood that an applicable technology(ies) gets overlooked early in the FS process*." Include all potentially applicable in situ and ex situ soil treatment technologies in Section 4.2, Table 2 and Table 4.

Note, where appropriate, which process options and remedial technologies would apply to both soil and groundwater impacted media. For example, covers are included as general process options for both media. Use consistent terminology between the two screening sections.

14. Section 4.2.2 Institutional Controls: This section should be written specifically for the soil media.

15. Section 4.2.2 Institutional Controls: It is noted that institutional controls protect human health and the environment by restricting land and groundwater use. However, since the restrictions placed on land and groundwater use may not protect ecological receptors, this statement should be revised.

16. 4.2.4 Containment – Soil Capping, Paragraph 1, Last Sentence: Explain what adverse impacts construction of a cover system over the entire site using standard construction techniques has on the surrounding neighborhood. Section 2.1.1 states that the surrounding area is sparsely populated.

17. Section 4.2.4 Containment – Soil Capping, Paragraph 2: The other technologies presented are technology descriptions and do not elaborate on disadvantages. Add discussion of disadvantage sections to the other technologies discussed.

18. Section 4.2.4 Containment – Soil Capping, Vegetative Cover: Although the cap would experience evaporation, vegetative covers in temperate areas like New Jersey are generally used to provide a physical barrier to prevent human and ecological contact and promote runoff to limit infiltration through positive drainage. Infiltration will occur during wet periods and the non-growing season.

19. Section 4.2.4 Containment – Soil Capping, Vegetative Cover: The description includes specific thicknesses for compacted soil and top soil. Recommend removing the specific thicknesses called out unless there is a site-specific basis provided; for example, a Hydrologic Evaluation of Landfill Performance (HELP) model developed using site-specific parameters.

20. Section 4.2.4 Containment – Soil Capping, Impermeable Cover: Refrain from using specific soil cover thickness in the absence of site-specific information. Explain how an impermeable cover with a 2-foot thick soil cover is an effective method for providing erosion control. At a minimum, the cover should meet landfill closure requirements.

21. Section 4.2.4 Containment – Soil Capping, Impermeable Cover: A degree of impermeability can also be obtained by construction of a low permeability clay layer coupled with the vegetative layer. Considering adding this option.

22. Section 4.2.5 In-Situ Chemical Treatment: Please change the title of this subsection to "In-Situ Chemical/Physical Treatment". Stabilization can be both a chemical and physical treatment process. Solidification is primarily a physical treatment process.

Typically, auger mixing systems and vitrification are considered in situ solidification/stabilization remedial technologies. The description of stabilization and solidification should include a discussion of how in situ mixing of reagents would generally be accomplished.

23. Section 4.2.5 In-situ Chemical Treatment: Stabilization and solidification are generally only effective treatment for inorganics with the processes described. In some cases, organics can actually

interfere with the chemical reactions of the stabilizer. Add the disclaimer similar to the statement at bottom of the page to the summary paragraph.

24. Section 4.2.6 Removal-Excavation and 4.2.7 Disposal: Since excavation is a requirement of all disposal options, the technologies should be combined and presented such as Excavation with off-site disposal, Excavation with consolidation and on site disposal and possibly Excavation with treatment and on-site disposal if ex-situ stabilization is considered.

25. Section 4.2.6 Removal - Excavation: Consider the impact of landfill debris on the excavation process and subsequent pre-treatment, if needed, and disposal.

26. Section 4.2.7 Disposal: Transportation of material for off-site should be considered a process option related to disposal.

27. Section 4.3 Remedial Technology Descriptions for Groundwater: Typical remedial technologies associated with in situ and ex situ treatment of contaminated groundwater were not considered. Revise to include all potentially applicable in situ and ex situ groundwater treatment technologies in Section 4.3, Table 3 and Table 5.

Note, where appropriate, which process options and remedial technologies would apply to both soil and groundwater impacted media. For example, covers are included as general process options for both media. Use consistent terminology between the two screening sections.

28. Section 4.3.2 Institutional Controls: This section repeats much of the same discussion points as Section 4.2.2. This section should be written specifically for the groundwater media. Include groundwater use restrictions. Please consider that NJDEP will require a Classification Exception Area (CEA) for ground water at the site if the Ground Water Quality Criteria for the Class IIA ground water will not be met at the site. The Administrative Requirements for Contaminated Sites (ARRCS) at N.J.A.C. 7:26C-7.3 contain the requirements for establishing, revising and removing a CEA for existing ground water contamination at the site, which includes use of the CEA/Well Restriction Area (WRA).

29. Section 4.3.3 Monitored natural Attenuation: The text should discuss if there are any indications that natural attenuation is occurring at the site.

30. Section 4.3.5 Containment – Barrier: Add a description of collection trenches.

31. Section 4.3.5 Containment – Barrier: Please separate this discussion into two sections with different titles as they are substantially different technologies; barriers and permeable reactive barriers (PRBs) or present PRBs as an in-situ physical treatment.

32. Section 4.3.7 In-Situ Chemical Treatment: Please add a brief discussion of the zero-valent iron.

33. Section 4.3.8 In-Situ Biological Treatment: Provide examples of carbon sources and oxygenates in the text. Also discuss bioagumentation.

34. Section 4.3.9 Ex-Situ –Physical Treatment: Change the title to Extraction and Ex-Situ Physical Treatment.

Tables

1.0 Table 1 Constituent Classes

1.1 The groundwater section states that PCBs were eliminated from further evaluation, but PCBs were reported above the Ground Water Quality Criterion of 0.5 ppb in the December 2014 samples from TWP-3, TWP-4, and TWP-8. Similarly, PAHs were excluded because the "constituent class [was] not detected at concentrations greater than Groundwater Quality Standard". However, PAHs (e.g. benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene) were reported in SVOC SIM samples in several temporary well points. The Constituent Classes Table in the DSRA shall consider all analytical results including the results from Data Gaps Sampling data before the elimination of constituent classes.

2.0 Table 2 Preliminary Screening of Remedial Technologies- Soil

2.1 The preliminary screening should consider all applicable process options and remedial technologies appropriate for all contaminant classes of concern.

2.2. Monitoring needs to be added as a general response action. This would be a component of an on-site containment remedy.

2.3. Include subsurface source controls as a remedial technology to the Containment general response action category. On-site containment may include construction of a liner system.

2.4. Solidification/stabilization is a physical and chemical remedial technology. Change the remedial technology description to "Physical/Chemical".

2.5. Solidification/stabilization would also require containment. The description of in-situ chemical treatment for solidification/stabilization only includes the use of cement. It should be noted that there are other agents that can be used to stabilize metals. Consider in-situ oxidation/reduction, precipitation/co-precipitation. This is when the use of a chemical oxidant can convert an inorganic contaminant to a less mobile form. This form of in-situ chemical treatment should be considered in the preliminary screening evaluation. Also, mention that this process option would be used in conjunction with other technologies.

2.6. Include other in situ physical and chemical soil remedial technologies. Soil vapor extraction is included as a groundwater process option. Soil vapor extraction would also be relevant to VOC soil contamination.

2.7. Include other remedial technology categories including biological and thermal treatment.

2.8. Include ex situ treatment as a general response action. Treatment technologies should consider all the contaminants of concern including inorganics, VOCs, SVOCs, PAHs, PCBs and pesticides.

2.9. Recommend off-site incineration be retained as a process option unless it can be shown that contaminated soil would not be considered a characteristic hazardous waste or trigger land disposal restrictions. It does not appear from the text that a preliminary determination has been made.

2.10. Explain why backfilling with un-impacted soil would require combination with other technologies such as capping and institutional controls. Removal of contaminated soil and backfilling with clean soil may result in an unrestricted use of site.

2.11. Explain why ex situ treatments necessary to generate soil for reuse are not considered appropriate for the site.

3.0 Table 3 Preliminary Screening of Remedial Technologies – Groundwater

3.1 The preliminary screening should consider all applicable process options and remedial technologies for all contaminant classes of concern.

3.2 Institutional controls may include groundwater use restrictions (NJ has Classification Exception Areas). Include groundwater use restrictions in the description of ICs.

3.3 Monitoring needs to be added as a general response action. Groundwater sampling would be a component of a groundwater treatment process option.

3.4 Use similar terminology for description of the soil cap process option for groundwater containment as is used in Table 2 for contaminated soil containment.

3.5 Groundwater extraction may also provide hydraulic control of the contaminant plume.

3.6 Groundwater recovery trenches may also provide hydraulic control of contaminated groundwater.

3.7 State that ozone injection would be combined with collection of vapors.

3.8 Chemical in situ remedial technologies are focused on oxidation of contaminants. Include in situ chemical/biological reduction technologies such as microscale and nanoscale emulsified zero-valent iron as a potential remedial technologies.

3.9 The description for enhanced reductive dechlorination states that native microorganisms would facilitate degradation. Enhanced reductive dechlorination could also be accomplished by bioaugmentation if native microorganisms are not present to facilitate biodegradation.

3.10 Include additional ex-situ groundwater treatment technologies to address the contaminants classes of concern. Future treatment scenarios may need to incorporate a treatment train that includes multiple technologies to address the range of constituent classes. Advanced oxidation processes should be considered as an ex situ treatment process option. Expand the precipitation process description option to include coagulation and flocculation.

3.11 Sludge from precipitation/coagulation/flocculation processes would require disposal. The decision rationale should include potential sludge disposal restrictions.

4.0 Table 4 Process Options Screening - Soil

4.1 Incorporate additional general response actions and in situ and ex situ soil remedial technologies to address other site contaminant classes. Include discussion of the effectiveness of the remedial technologies to address the various contaminant classes.

4.2 Rank the effectiveness, implementability and relative cost of No Action. No Action would not result in decreased residual risk since no action is being taken and therefore would have no long-term effectiveness or permanence; would be the easiest to implement, as it requires no action; and would not involve any cost.

4.3 In-Situ Treatment: Solidification/stabilization has limited effectiveness for VOCs, SVOCs, PAHs and pesticides. In situ treatment would require significant mixing of contaminated soil with various additives to achieve the remedial goals.

4.4 Include the impact a large volume of contaminated soil may have on a receiving landfill for the off-site landfill disposal process option.

4.5 On-site consolidation would likely require subsurface source control. Add subsurface source control under the containment general response action.

4.6 Backfilling excavation should be retained for further evaluation. Although backfilling treated soil may not occur, backfilling with clean material may be included under an excavation and off-site disposal or an on-site consolidation scenario. Backfilling may be eliminated during remedial alternative development if a stated objective of the remediation alternative is to create open water areas, for example.

4.7 Tables 4 and 5 identify which technologies have been retained versus those that have been screened out. However, in the last column, the rationale is often unclear in terms of why a certain technology has not been retained. For example, “less effective than other remedial technologies” is often used as the rationale, but this is too vague. Provide additional rationale to clarify why technologies are not being retained.

5.0 Table 5 Process Options Screening - Groundwater

5.1 See comments on Table 3 concerning incorporating additional general response actions and in situ and ex situ groundwater remedial technologies to address contaminant classes other than inorganics and VOCs.

5.2 Evaluate the effectiveness, implementability and relative cost of No Action. No Action would not result in decreased residual risk since no action is being taken and therefore would have no long-term effectiveness or permanence; would be the easiest to implement, as it requires no action; and would not involve any cost.

5.3 Correct the effectiveness statement for monitored natural attenuation (MNA). MNA is a process option that relies on natural processes to achieve a reduction of COCs within a reasonable time frame. The process option itself does not prevent the exposure pathway.

5.4 Soil cap process option should use similar terminology as is used for the contaminated soil process options.

5.5 The trenched cut-off wall process option appears to be eliminated from considered as it is shaded, but the cell for Yes or No was left blank. Please correct.

5.6 Sheet piling should be considered a process option considered for further evaluation. Given the site conditions, it may be simpler to install sheet piling than a permeable reactive wall.

5.7 Groundwater extraction was eliminated from further consideration but typical ex situ treatment process options were retained. Groundwater extraction is a typical process option for contaminated groundwater sites and should be considered for further evaluation. In addition, dewatering may be needed in combination with other process options.

5.8 Clarify that soil vapor extraction removes VOCs from the vadose zone. Consider the thickness of the vadose zone and depth to groundwater table at the site when evaluating the effectiveness of this process option. Note that soil vapor extraction should be a soil treatment technology.

5.9 Include the ability to capture vapors at the site based on the depth to groundwater when evaluating the effectiveness of air sparging.

5.10 In situ treatment technologies listed focus on VOCs. However, other contaminant classes such as PAHs, PCBs and pesticides are present. Consider the ability of the in situ treatment technologies to address other contaminant classes when evaluating their effectiveness. Include additional in situ treatment technologies to address PAHs, PCBs and pesticides.

5.11 Include the ability of ex situ treatment technologies to address other contaminant classes when evaluating their effectiveness.

5.12 The effectiveness of ion exchange is contaminant specific. Please explain why ion exchange has a high effectiveness.

5.13 The implementability evaluation for the precipitation process option discusses sampling and disposal of sediment. The description should be corrected to cite sampling and disposal of sludge, not sediment.